
कैल्शियम अल्जिनेट, खाद्य
ग्रेड — विशिष्टि
(दूसरा पुनरीक्षण)

Calcium Alginate, Food
Grade — Specification
(Second Revision)

ICS 67.220.20

© BIS 2018



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली-110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.org.in www.standardsbis.in

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Food Additives Sectional Committee had been approved by the Food and Agriculture Division Council.

With the increased production of processed foods, manufacturers are adding a large number of substances (food additives) generally in small quantities to improve the appearance and properties of the processed foods like flavour, texture or storage properties, etc. As certain impurities in these substances have been found to be harmful, it is necessary to have a strict quality control of these food additives.

Calcium alginate has an excellent functionality as a thickening agent, gelling agent, emulsifier, stabilizer, texture-improver to improve the quality of food. Safety of calcium alginate for food applications is certified by FAO/WHO, as one of the safest food additives and it is in the approved list under *Food Safety and Standards (Food Products Standards and Food Additives) Regulations*, 2011.

This standard was first published in 1975. This standard was revised in 1996 to cover purity and identification of the substances. The standard was intended to help in checking purity which is required to be checked at the stage of manufacture, for it is difficult to detect the impurity once the additives have been added to the processed foods. Besides, the standard was also intended to guide the indigenous manufacturers in making their product conform to specifications that are accepted by scientists, health authorities and international bodies.

This revision has been undertaken to incorporate the amendment to previous standard and harmonize the standard with the existing JECFA specification. Apart from stricter levels of chemical impurities and identification requirements, the revision also includes requirements for pathogenic microbiological contamination like *Salmonella* and *Coliforms* considering the plant origin of the product.

In the formulation of this standard, due consideration has been given to the provisions of the *Food Safety and Standards Act*, 2006 and the Rules and Regulations framed thereunder and the *Legal Metrology (Packaged Commodities) Rules*, 2011. However, this standard is subject to the restrictions imposed under these, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CALCIUM ALGINATE, FOOD GRADE — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for calcium alginate, food grade.

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

<i>IS No.</i>	<i>Title</i>
1070 : 1977	Water for general laboratory use (<i>second revision</i>)
1699 : 1994	Methods of sampling and test for food colours (<i>second revision</i>)
2491 : 2013	Food hygiene — General principles — Code of practice (<i>third revision</i>)
5306 : 1996	Sodium carboxymethyl cellulose, food grade (<i>second revision</i>)
5401 (Part 1) : 2012	Microbiology of food and animal feeding stuffs — horizontal method for the detection and enumeration of coliforms : Part 1 colony count technique
5402 : 2012/ ISO 4833 : 2003	Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of micro-organisms – colony count technique at 30°C by pour plate technique (<i>second revision</i>)
5403 : 1999	Method for enumeration of yeast and mould count in foodstuffs and animal feeds (<i>first revision</i>)
5887 (Part 3) : 1999	Methods for detection of bacteria responsible for food poisoning: Part 3 General guidance on methods for detection of <i>Salmonella</i>
7928 : 1992	Alginate acid, food grade

3 REQUIREMENTS

3.1 Description

The product shall be a white to yellowish, fibrous or granular powder. It shall be nearly odourless and

tasteless. It is insoluble in water and ether; slightly soluble in ethanol; slowly soluble in solutions of sodium polyphosphate, sodium carbonate and substances that combine with the calcium.

3.2 Identification Tests

3.2.1 Test for Calcium

Insoluble oxalate salts are formed when solutions of calcium salts are treated in the following manner:

Using 2 drops of methyl red as indicator, neutralize a solution of a calcium salt (1 in 20) with ammonia, and then add diluted hydrochloric acid, dropwise, until the solution is acidic. A white precipitate of calcium oxalate forms upon the addition of ammonium oxalate. This precipitate is insoluble in acetic acid but dissolves in hydrochloric acid.

3.2.1.1 Calcium salts moistened with hydrochloric acid impart a transient yellowish red colour to a non-luminous flame.

3.2.2 Test for Alginic Acid

To about 5 mg product, contained in a test tube, add 5 ml of water, 1 ml of a freshly prepared 1 in 100 solution of naphtholresorcinol in ethanol, and 5 ml of hydrochloric acid. Heat the mixture to boiling, boil gently for about 3 min, and then cool to about 15°C. Transfer the contents of the test tube to a 30 ml separator with the aid of 5 ml of water and extract with 15 ml of isopropyl ether. Perform a blank test. The isopropyl ether extract from the sample exhibits a deeper purplish hue than that from the blank.

3.2.3 Precipitate formation with calcium chloride

To a 0.5 percent solution of the sample in sodium hydroxide test solution add one-fifth of its volume of a 2.5 percent solution of calcium chloride. A voluminous, gelatinous precipitate is formed. This test distinguishes calcium alginate from gum arabic, sodium carboxymethyl cellulose, carrageenan, gelatin, gum ghatti, karaya gum, carob bean gum, methyl cellulose and tragacanth gum.

3.2.4 Precipitate formation with ammonium sulphate

To a 0.5 percent solution of the sample in sodium hydroxide test solution add one-half of its volume of a saturated solution of ammonium sulphate. No precipitate is formed. This test distinguishes calcium

IS 7905 : 2018

alginate from agar, sodium carboxymethyl cellulose, carrageenan, de-esterified pectin, gelatin, carob bean gum, methyl cellulose and starch.

3.3 The product shall be processed, packed, stored and distributed under hygienic conditions in licensed premises (*see* IS 2491).

3.4 Microbiological Requirements

3.4.1 *Coliforms* shall be absent in 1 g of the sample when tested in accordance with the method given in IS 5401 (Part 1).

3.4.2 *Salmonella* shall be absent in 10 g sample when tested in accordance with the method given in IS 5887 (Part 7).

3.4.3 Yeast and mould count shall not be more than 500/g of the when tested in accordance with the method given in IS 5403.

3.4.4 The total viable colony count shall not exceed 5 000/g when tested in accordance with the method given in IS 5402.

3.5 The material shall also conform to the requirements given in Table 1.

4 PACKING, STORAGE AND MARKING

4.1 Packing

The material shall be filled in containers with as little air space as possible. The containers shall be such as to preclude contamination of the contents with metals or other impurities.

4.2 Storage

The material shall be stored in a cool and dry place so as to avoid excessive exposure to heat.

4.3 Marking

Each container shall be legibly and indelibly marked with the following information:

- Name of the material including the words 'Food Grade',
- Indication of the source of manufacture;
- Minimum net mass or content;
- Batch or code number;
- Date of manufacture;
- Any other requirements as specified under the *Legal Metrology (Packaged Commodities) Rules, 2011* and *Food Safety and Standards (Packaging and Labelling) Regulation, 2011* and the Rules framed thereunder;
- Instruction for storage.

4.3.1 BIS Certification Marking

The product may also be marked with the Standard Mark.

4.3.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

5 SAMPLING

5.1 The representative samples of the material shall be drawn according to the method prescribed in **4** of IS 1699.

6 TESTS

6.1 Quality of Reagents

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the result of analysis.

Table 1 Requirements for Calcium Alginate
(Clause 3.5)

Sl No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Purity as $[(C_3H_7O_6)_2Ca]$, percent by mass	89.6 to 104.5	Annex A
ii)	Loss on drying, percent by mass, <i>Max</i>	18.0	Annex C of IS 5306
iii)	Total Ash, percent by mass, <i>Max</i>	18 to 27	A-4 of IS 7928
iv)	Acid Insoluble Ash, percent by mass, <i>Max</i>	0.05	A-5 of IS 7928
v)	Insoluble matter, percent by mass, <i>Max</i>	0.2	A-2 of IS 7928
vi)	Lead (as Pb), mg/kg, <i>Max</i>	5	15 of IS 1699
vii)	Arsenic (as As), mg/kg, <i>Max</i>	3	15 of IS 1699
viii)	Heavy Metals (as Pb), mg/kg, <i>Max</i>	10	16 of IS 1699

ANNEX A

[Table 1, *Sl No. (i)*]

DETERMINATION OF PURITY

A-1 METHOD

A-1.1 Method given in **A-1** of IS 7928 may be followed.
Each millilitre of 0.25 N sodium hydroxide consumed

in the assay is equivalent to 27.38 mg of calcium alginate.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

This Indian Standard has been developed from Doc No.: FAD 8 (2014).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones : 2323 0131, 2323 3375, 2323 9402

Website: www.bis.org.in

Regional Offices:

Telephones

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

{ 2323 7617
2323 3841

Eastern : 1/14 C.I.T. Scheme VII M, V. I. P. Road, Kankurgachi
KOLKATA 700054

{ 2337 8499, 2337 8561
2337 8626, 2337 9120

Northern : Plot No. 4-A, Sector 27-B, Madhya Marg, CHANDIGARH 160019

{ 26 50206
265 0290

Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113

{ 2254 1216, 2254 1442
2254 2519, 2254 2315

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
MUMBAI 400093

{ 2832 9295, 2832 7858
2832 7891, 2832 7892

Branches: AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. COIMBATORE.
DEHRADUN. DURGAPUR. FARIDABAD. GHAZIABAD. GUWAHATI.
HYDERABAD. JAIPUR. JAMMU. JAMSHEDPUR. KOCHI. LUCKNOW. NAGPUR.
PARWANOO. PATNA. PUNE. RAIPUR. RAJKOT. VISAKHAPATNAM.

Published by BIS, New Delhi